

Leaf and pod reaction of VAX lines to Bulgarian *Xanthomonas axonopodis* pv. *phaseoli* strains

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Breeding for resistance to *Xanthomonas axonopodis* pv. *phaseoli* is one of the major goals of the Dry Bean Breeding Program at Dobroudja Agricultural Institute, General Toshevo, Bulgaria (DAI). A number of bean accessions with reported resistance to common bacterial blight (CBB) were introduced in the DAI collection during the past years. Some of them (XAN 159, G.N. Jules and BAC 6) are the most used resistant donors in many beans breeding program worldwide. Recently, VAX 1-6 lines with pyramidal resistance to CBB have been reported (Singh and Muñoz, 1999, Crop Sci. 39:80-89).

The resistance of common bean to CBB is under polygenic control and closely related to plant organ specificity, environmental conditions and virulence of bacterial strains. This imposes the necessity to test resistant donors at the environments used for breeding of new cultivars. The aims of the present study were: i- to evaluate leaf and pod reaction of VAX lines and some of their resistant parents to Bulgarian *X.a. pv. phaseoli* strains; ii- to select bacterial strains for markers to further usage of these donors in DAI bean breeding programs.

Material and Methods

The VAX 1-6 lines and some of their parents were grown in the field in 1 m randomized rows (10 plants in the row, two replications for strain x line) during 2002. Ten bacterial strains from different regions of Bulgaria were included in the study. The strains were grown on YDC at 27°C for 48 h, and bacterial suspension (10^8 cfu/ml) was prepared in sterile tap water. The leaves were inoculated at flowering stage by the multiple needle method (Andrus, 1948, Phytopathology 38:757-759). A hypodermic needle and 1 ml syringe were used for inoculation of the pods. The disease reaction was recorded 14 days after inoculation. A nine-degree scale (1 - no visible symptoms; 9 - over 85% of inoculated tissue with blight symptoms) was used for the leaves, and size of lesions (mm) was recorded for the pods.

Results and Discussion

High resistance of leaves to the used strains was observed in lines VAX 3, 4, 5 and 6 and XAN 159 (tab. 1). An insignificant variation of leaf reaction to some strains was registered in VAX 5 and XAN 159. Lines VAX 1 and 2 developed more severe blight symptoms to XB013.1F and XB015.1F (fuscans strains) in comparison to the other strains. These strains were considerably more aggressive to A 769 and G.N. Jules than the others.

Lines VAX 3, 4, 5 and 6 and XAN 159 showed a higher pod resistance to the strains included in the study (tab.2). The pod resistance of VAX 1 and 2, A769 and G.N. Jules were lower than in the other lines.

The results obtained showed that lines VAX 3, 4, 5 and 6, as well as XAN 159 are the most suitable donors for resistance to Bulgarian *X.a. pv. phaseoli* populations.

Table 1. CBB leaf reaction of lines VAX 1-6 and some of their parents to 10 Bulgarian strains of *X.a.pv. phaseoli*

Strain	Dobr.7*	XAN 159	Jules	A 769	VAX 1	VAX 2	VAX 3	VAX 4	VAX 5	VAX 6
XB 9622.1	8.6	1.3	3.2	3.3	1.8	1.4	1.0	1.0	1.4	1.0
XB 9625.1	9.0	1.1	2.4	3.8	1.4	1.3	1.0	1.0	1.3	1.0
XB 9913.2	8.0	1.3	2.9	3.5	1.6	1.4	1.0	1.0	1.4	1.0
XB 011.1	8.0	1.2	2.1	2.0	1.5	1.6	1.0	1.0	1.3	1.0
XB 014.1	7.0	1.0	2.2	1.8	1.7	1.1	1.0	1.0	1.0	1.0
XB 013.1F	8.2	1.0	4.1	4.8	4.3	2.7	1.0	1.0	1.0	1.0
XB 006.1	7.8	1.0	2.4	2.8	1.8	1.3	1.0	1.0	1.5	1.0
XB 015.1F	8.3	1.0	3.9	5.5	3.5	2.6	1.0	1.0	1.0	1.0
XB 019.1	8.6	1.5	1.3	2.2	1.2	1.0	1.0	1.0	1.0	1.0
XB 007.1	8.6	1.0	3.2	3.3	1.5	1.4	1.0	1.0	1.3	1.0

*Dobroudjanski 7 -susceptible check

Table 2. CBB lesion size (mm) on pods of lines VAX 1-6 and some of their parents after inoculation with 10 Bulgarian strains of *X.a. pv. phaseoli*

Strain	Dobr.7*	XAN 159	A 769	Jules	VAX 1	VAX 2	VAX 3	VAX 4	VAX 5	VAX 6
XB 9622.1	7.5	2.7	4.1	3.4	4.7	5.7	1.4	1.2	2.3	1.7
XB 9625.1	5.7	1.7	2.7	2.8	4.3	4.1	1.6	1.2	2.7	1.6
XB 9913.2	4.8	3.1	3.8	3.9	4.8	4.9	1.4	1.9	1.9	1.8
XB 011.1	5.5	2.3	4.0	2.6	4.5	4.9	2.5	0.9	2.3	1.7
XB 014.1	5.5	1.9	2.3	2.3	3.1	3.0	0.8	1.3	1.9	1.2
XB 013.1F	4.2	2.4	4.3	4.3	4.7	5.4	2.2	1.9	1.9	2.9
XB 006.1	6.2	1.8	3.2	3.4	4.7	4.8	1.6	1.6	2.7	1.8
XB 015.1F	5.1	2.6	3.3	3.6	3.7	4.2	1.7	1.8	2.0	1.9
XB 019.1	7.0	2.1	1.8	1.4	3.1	3.3	1.9	1.2	1.8	1.4
XB 007.1	9.0	2.2	4.6	3.5	6.1	6.1	1.6	1.6	2.5	1.1

*Dobroudjanski 7 -susceptible check

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